

Okamoto, Takashi; Yatsushashi, Jiro; Mizutani, Naoki

**Conference Paper**

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14th Asia-Pacific Regional Conference of the International Telecommunications Society (ITS): "Mapping ICT into Transformation for the Next Information Society", Kyoto, Japan, 24th-27th June, 2017

**Provided in Cooperation with:**

International Telecommunications Society (ITS)

*Suggested Citation:* Okamoto, Takashi; Yatsushashi, Jiro; Mizutani, Naoki (2017) : Priorities of Smartphone Online Shopping Applications for Young People, 14th Asia-Pacific Regional Conference of the International Telecommunications Society (ITS): "Mapping ICT into Transformation for the Next Information Society", Kyoto, Japan, 24th-27th June, 2017, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/168528>

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# Priorities of Smartphone Online Shopping Applications for Young People

Takashi. Okamoto  
Ehime University  
3 Bunkyo-cho  
Matsuyama  
Ehime, Japan

okamoto.takashi.me@ehime-u.ac.jp

Jiro. Yatsunashi  
Kanagawa University  
3-27-1 Rokkakubashi  
Kanagawa-ku, Yokohama  
Kanagawa, Japan

jiro@kanagawa-u.ac.jp

Naoki. Mizutani  
Okayama University of Science  
1-1 Ridai-cho  
Kita-ku, Okayama  
Okayama, Japan

mizutani@mgt.ous.ac.jp

## Abstract

With widespread use of smartphones, many people use smartphone online shopping applications to enjoy online purchasing. However, Japanese young people's behavior and perceptions with regard to smartphone online shopping applications are unclear. To reveal these perceptions and priorities, this study examined Japanese respondents' adoption of online shopping applications on smartphones by applying a choice-based conjoint analysis. This study revealed that our respondents place the highest priority on the security considerations of online shopping applications. Popularity is another important attribute of online shopping applications. Gender, living area, and users' online purchase experience affect young people's priorities for smartphone online purchasing.

## Keywords

Online Shopping Behavior, Smartphone Shopping Applications, Priorities, Conjoint Analysis

## 1 Introduction

The Japanese population rate of smartphone owners has been increasing rapidly in recent years, making smartphones a common device. Many people use the Internet through their smartphones and enjoy online purchasing, with some people using smartphone online shopping applications (apps). Smartphone applications are transforming the retail world [1].

Some young people use the smartphone applications of specific online shops or malls for their online purchases. They install their favorite online shopping applications on their smartphones, such as applications for famous malls, specialized stores, music download sites, and flea markets. Young people tap on such applications directly, access the shopping sites, and

search for and purchase the goods. If young people do not have the applications of specific online shops, they are unlikely to purchase these goods from the stores. Therefore, the use of an online shop's application might be essential for the shop's sales. Thus, online shopping applications play an important role in online purchasing.

Prior studies have indicated that the younger generation uses the newer functions of smartphones and place high priority on these functions. However, their evaluation of legacy functions, such as e-mails and web browsers, is very low [2]. Young people often purchase goods directly via specific smartphone online applications instead of searching for goods by web browser and purchasing them from online stores found via these searches.

Many studies have examined online purchase intentions and have revealed factors that affect online purchasing. However, it is not clear young people's behavior and perceptions with regard to smartphone online shopping applications are unclear. To reveal these perceptions and priorities, this study administered questionnaires to examine respondents' adoption of online shopping applications on smartphones and applied a choice-based conjoint analysis to the questionnaire data.

Our research demonstrates that more than 70% of respondents had installed online shopping applications. Friends' word of mouth was the trigger for installing the applications for about half of these respondents. In addition, our research reveals that the respondents placed highest priority on the security considerations of online shopping applications. Popularity is another important attribute of online shopping applications. Furthermore, some user demographics affect respondents' priorities for smartphone online purchasing, such as gender and living area. In addition, users' online

purchase experience affects their priorities for smartphone online purchasing.

The findings of this study contribute to the development of online shops' sales strategies. Moreover, revealed users' priorities of smartphone online shopping attributes contribute to developing shopping applications.

## 2 Literature Review

Many studies have profiled consumers' purchasing behavior and examined consumers' perceptions of online shopping markets. With regard to online shopping experience, Cho [3] revealed that consumers with histories of purchasing via the Internet and high purchasing frequencies from catalogs are less likely to avoid online shopping. In addition, Pires et al. [4] indicated that satisfaction with prior online purchasing is negatively associated with the perceived risk of intended purchases. Consumer attitudes toward online shopping are determined by trust and perceived benefits [5]. Chen et al. [6] reported that gender moderates the impact of perceived benefits to consumers' intention to purchase.

Widespread use of smartphones affects the behavior and perceptions of online shopping. Ueda [2] reported on smartphone adoption behavior for university students using choice-based conjoint analysis. The study indicates that the younger generation freely uses new smartphone platforms. For young people, switching costs from legacy services to those of new smartphones are relatively low. Members of the young generation place relatively high priority on new smartphones' functions. Regarding the selection process of online purchasing, Kinjo and Higashikuni [7] indicated that information obtained from mass media and review sites is often used for making purchase decisions about products of high interest.

## 3 Research Questions and Methodology

Many studies have examined online purchase behavior and revealed factors that affect online purchasing. However, young people's behavior and perceptions with regard to smartphone online shopping applications are unclear. In addition, young people's priorities regarding the attributes of applications have not yet been revealed.

Thus, this study addressed the following research questions.

RQ1. What triggers the installation of smartphone online shopping applications?

RQ2. What are young people's priorities with regard to the attributes of the applications?

RQ3. What factors affect these priorities and how?

To fulfill these research objectives, this study administered questionnaires. Our survey was conducted in two phases. The first phase gathered basic information on respondents' smartphone application usage. We examined the respondents' behavior during online shopping with smartphones and analyzed respondents' adoption of online shopping applications.

In the second phase, this study applied a choice-based conjoint analysis to the data collected from the questionnaires. Conjoint analysis is an effective research method that reveals preferences for specific attributes in order to understand the factors that influence consumers' purchase intentions and their relative importance. This study examined the following five attributes of smartphone applications of online shops that influence online purchasing: assortment, popularity, availability of scarce goods, concerns about security and personal information, and bonus point ratio. The analysis revealed the respondents' priorities for each of these five attributes.

## 4 Respondent Composition and Questionnaire Description

### 4.1 Data collection and respondent composition

Our respondents comprised university students. The research was conducted in April 2017 and used a self-administered questionnaire. Table 1 reports respondents' demographic details. Our valid respondents were 757 students registered at Ehime University, Kanagawa University, or Waseda University. Ehime University is located in a rural area while the other two universities are located in urban areas. The respondents' majors were social science. There were equal grades of respondents although some deviations in composition of grade among universities existed. Almost all respondents were familiar with smartphones and the Internet.

**Table 1: Composition of valid respondents**

| Demographic details | Category | Number of respondents |                |              |
|---------------------|----------|-----------------------|----------------|--------------|
|                     |          | Ehime Univ.           | Kanagawa Univ. | Waseda Univ. |
| Gender              | Female   | 114                   | 224            | 90           |
|                     | Male     | 135                   | 137            | 57           |
| Grade               | 1st.     | 1                     | 207            | 0            |
|                     | 2nd.     | 76                    | 48             | 37           |
|                     | 3rd.     | 130                   | 78             | 88           |
|                     | 4th.     | 41                    | 28             | 17           |
|                     | Other    | 1                     | 0              | 5            |

## 4.2 Description of questionnaire

Our questionnaire sought information about three types of behavior with respect to online smartphone applications. The first was the number of respondents who installed such applications on their smartphones. The second described triggers that prompted the installation of these applications, such as various media, word of mouth from friends, and celebrities' social networking services (SNSs) (see Table 3). The third was respondents' use of either applications or a web browser when searching for goods using smartphones.

In addition, our research adopted the discrete choice method. In this analysis, we focused on the priorities for online purchasing applications on smartphones. The details of our questionnaire are provided in our prior study [8]. The attributes of online shops significantly affect the students' decisions to install online shipping applications on their smartphones. An application is a portal for a specific online shop. The installation of an application on consumers' smartphones indicates that the shop has become a favorite.

Our questionnaire defined five attributes of smartphone online shopping applications, based on prior studies [8,9], as reported in Table 2: (1) "assortment," referring to the online shop's collection of goods; (2) "popularity," referring to how well known an online shop is; (3) "availability of scarce goods," referring to the degree of availability of scarce goods in an online shop; (4) "concerns about security and personal information," referring to the extent to which a shop is concerned about security and protection of users' personal information; and (5) "points ratio," referring to the rate of economic rewards for using an online shop. In addition, Table 2 defines these attributes' priority levels.

**Table 2: Attributes and their priority levels**

| Attribute  | Level 1         | Level 2          | Level 3 |
|--|-----------------|------------------|---------|
| Assortment                                       | Average         | Rich             |         |
| Popularity                                       | Unknown         | Famous           |         |
| Availability of scarce goods                     | Unavailable     | Available        |         |
| Concerns about security and personal information | Normal concerns | Special concerns |         |
| Points ratio                                     | 0%              | 3%               | 5%      |

The procedures for making conjoint analysis choice cards or the simulation method of conjoint analysis are referenced from prior studies [9,10]. In addition, an alternative specific constant (ASC) was added to the analysis, following prior studies. A negative ASC value could be interpreted as affirmative for the installation of an application.

## 5 Results and Discussions

### 5.1 Triggers for the installation of smartphone online purchasing applications

The results of the basic questions demonstrate that 71% of students had installed online shopping applications on their smartphones while 43% of students had installed one or two applications. These results imply that most students installed online shopping applications. The average number of installed online shopping applications, however, was not large.

The results reported in Table 3 illustrate the triggers for students' installation of smartphone online purchasing applications. Specifically, 48% of students had heard about their installed applications from friends, making friends' word of mouth a representative trigger for the installation of the smartphone online purchasing applications. Meanwhile, 26% of students had installed the applications using information from TV, magazine, or newspaper sources, and 23% had installed applications using information from the web portals. Most triggers were friends' word of mouth, mass media, and web portals.

**Table 3: Triggers for the installation of smartphone online shopping applications**

| Category                    |                                | Percentage of respondents |
|-----------------------------|--------------------------------|---------------------------|
| Triggers (multiple answers) | Friends                        | 259 (48%)                 |
|                             | SNS of celebrity               | 27 (5%)                   |
|                             | TV, magazine, newspaper        | 140 (26%)                 |
|                             | Review sites of applications   | 65 (12%)                  |
|                             | Web portals                    | 125 (23%)                 |
|                             | Campaign of getting points     | 59 (11%)                  |
|                             | Web banner                     | 41 (8%)                   |
|                             | Recommendation at retail shops | 33 (6%)                   |
|                             | Pre-installed                  | 15 (3%)                   |
|                             | Other                          | 23 (4%)                   |

Note: Numbers in parentheses are the ratios among respondents who installed smartphone online shopping applications.

## 5.2 Priorities for attributes of online smartphone purchasing applications

To examine how respondents valued different online purchasing application features on smartphones, our research adopted the discrete choice method, following prior studies [8-10]. The investigation results are illustrated in Table 4. This analysis reveals the respondents' priorities for each attribute of online applications. The estimated coefficient of the conjoint analysis shows marginal utility.

The ASC of our research was estimated as significantly positive. This result implies that these five attributes were not sufficiently chosen and there might have been other attributes that respondents valued. These five attributes could serve to examine users' priorities for attributes, because they were all estimated as significant at the 1% level. Most respondents were likely to have been in favor of online purchase applications on smartphones, as they had used the applications, as the basic results presented in Subsection 5.1 show.

The results reported in Table 4 demonstrate that the coefficient—representing the marginal utility—of concerns about security and personal information was 2.604, the largest among the five attributes. This was followed by popularity, with a coefficient of 1.654. The value of each variable's coefficient divided by each bonus point ratio's coefficient indicates the marginal utility, which evaluates preference per bonus point. This value for concerns about security and personal information was 11.9, indicating that the marginal utility of concerns about security and personal information was

equivalent to 11.9% per bonus point. The comparative value for popularity was 7.6. Thus, respondents valued concerns about security and personal information 1.6 times more than they valued the popularity of online shops.

Therefore, respondents' concerns about security and personal information of online shops were found to be substantially more significant than the popularity of online shops. This finding implies that respondents highly valued the former, which could strongly affect online purchasing and the adoption of online shopping applications. In addition, respondents valued the popularity of online shops. This is consistent with the results for triggers for the installation of applications.

The coefficient of assortment was 1.211 while that of the availability of scarce goods was 1.012. These results indicate that the marginal utilities of assortment and availability of scarce goods were relatively small among these five attributes, and imply that respondents did not place relative importance on these two attributes for online shops. Nonetheless, assortment was an important attribute for users; the result could be explained by the provision of wide assortment by all online shops, making the attribute a non-differentiating parameter, as respondents were satisfied with the average assortment provided.

Our prior research showed that people did not place high priority on concerns about security and personal information for online shops [8-10]. We cannot simply compare these studies, as even the alternatives provided in the questionnaires differ. Changing devices from PC to smartphone for online shopping would affect respondents' priorities, especially for concerns about security and personal information.

**Table 4: Estimated results of priorities for smartphone online purchasing applications**

| Variable   | Coefficient | t-value | P-value |
|--|-------------|---------|---------|
| Assortment***  | 1.211       | 16.47   | 0.000   |
| Popularity***  | 1.654       | 19.76   | 0.000   |
| Availability of scarce goods***                      | 1.012       | 13.99   | 0.000   |
| Concerns about security and personal information *** | 2.604       | 22.74   | 0.000   |
| Points ratio ***                                     | 0.219       | 13.68   | 0.000   |
| ASC***   | 1.782       | 9.44    | 0.000   |

Note: \*\*\* represents significance at the 1% level

### 5.3 Differences of priorities by gender

Users' demographics might have affected their priorities for smartphone online purchasing. We examined the influence of users' gender. Table 5 reports the results when a dummy variable relating to gender was introduced.

Our results indicated that the dummies of assortment and availability of scarce goods were statistically significant and positive. These results imply that female students evaluated the assortment and availability of scarce goods higher than male students did. Female students might have placed higher value on shopping functions of online shopping than male students did. In addition, our results indicated that the dummy of popularity was statistically significant and negative. This implies that female students did not highly value the popularity of online shops. Their perceived value of the popularity of online shops was equivalent to two bonus points. The dummy of assortment and availability of scarce goods was not statistically significant. This implies that female and male students cared equally about security and personal information in online shopping.

**Table 5: Estimated results including gender differences**

| Variable  | Coefficient | t-value | P-value |
|---|-------------|---------|---------|
| Assortment***   | 1.014       | 10.18   | 0.000   |
| Popularity***   | 1.951       | 16.67   | 0.000   |
| Availability of scarce goods***                           | 0.839       | 9.03    | 0.000   |
| Concerns about security and personal information ***      | 2.796       | 17.79   | 0.000   |
| Points ratio ***  | 0.204       | 8.94    | 0.000   |
| Male dummies  |             |         |         |
| Dummy of assortment***                                    | 0.349       | 2.81    | 0.005   |
| Dummy of popularity***                                    | -0.439      | -3.18   | 0.002   |
| Dummy of availability of scarce goods***                  | 0.364       | 2.98    | 0.003   |
| Dummy of concerns about security and personal information | -0.207      | -1.13   | 0.258   |
| Dummy of points ratio                                     | 0.040       | 1.38    | 0.167   |
| ASC***  | 1.767       | 9.79    | 0.000   |

Note: \*\*\* represents significance at the 1% level.

### 5.4 Influence of students' living area

Another demographic feature, namely, students' living area, might also have affected their priorities for smartphone online purchasing. People living in urban areas could have more opportunities to purchase goods in bricks-and-mortar stores than people living in rural areas could. Table 6 reports the results when the dummy variable relating to students' living area was introduced.

The dummies of assortment, popularity, and concerns about security and personal information were statistically significant and positive. These results imply that students who lived in the rural area, Ehime, valued shops' assortment more than urban students did. The assortment of bricks-and-mortar shops in rural areas is not extensive compared to urban shops, and thus, online shopping is an important channel of purchasing for rural students. In our study, rural students valued the popularity of online shops, because rural students might not have sufficient reputation of online shops compared to urban students. Regarding concerns about security and personal information, rural students valued security protection of online shops twice as much as urban students did.

**Table 6: Estimated results including differences by living location**

| Variable   | Coefficient | t-value | P-value |
|--|-------------|---------|---------|
| Assortment***  | 1.136       | 14.18   | 0.000   |
| Popularity***  | 1.580       | 17.00   | 0.000   |
| Availability of scarce goods***                              | 1.008       | 12.83   | 0.000   |
| Concerns about security and personal information ***         | 1.008       | 18.65   | 0.000   |
| Points ratio ***   | 0.215       | 11.86   | 0.000   |
| Rural place dummies  |             |         |         |
| Dummy of assortment**  | 0.308       | 2.03    | 0.042   |
| Dummy of popularity**  | 0.399       | 2.43    | 0.015   |
| Dummy of availability of scarce goods                        | 0.249       | 1.69    | 0.091   |
| Dummy of concerns about security and personal information*** | 0.812       | 3.27    | 0.001   |
| Dummy of points ratio  | 0.044       | 1.38    | 0.167   |
| ASC***   | 1.760       | 8.95    | 0.000   |

Note: \*\*\* and \*\* represent significance at the 1% and 5% levels, respectively.

## 5.5 Influence of online purchase experience

As prior studies have indicated [11], users' online purchase experience might affect their priorities for smartphone online purchasing. We examined the influence of online purchase experience. Table 7 reports the results when the dummy variable relating to online purchase experience was introduced.

The dummy of concerns about security and personal information was estimated as statistically significant and positive. In addition, the dummies of assortment, availability of scarce goods, and point ratio were statistically significant and negative. These results imply that students who were inexperienced in online purchases highly valued concerns about security and personal information. These students might have overestimated the risks of online purchasing, because they did not have online purchase experience.

**Table 7: Estimated results including differences in online purchase experience**

| Variable   | Coefficient | t-value | P-value |
|--|-------------|---------|---------|
| Assortment***  | 1.244       | 16.46   | 0.000   |
| Popularity***  | 1.702       | 19.08   | 0.000   |
| Availability of scarce goods***                              | 1.117       | 14.64   | 0.000   |
| Concerns about security and personal information ***         | 2.487       | 20.64   | 0.000   |
| Points ratio ***   | 0.241       | 14.79   | 0.000   |
| Online purchase untried dummies                              |             |         |         |
| Dummy of assortment**  | -0.507      | -2.27   | 0.023   |
| Dummy of popularity  | 0.207       | 0.78    | 0.437   |
| Dummy of availability of scarce goods***                     | -0.794      | -3.14   | 0.002   |
| Dummy of concerns about security and personal information*** | 1.179       | 3.69    | 0.000   |
| Dummy of points ratio***                                     | -0.178      | -2.62   | 0.009   |
| ASC***   | 1.796       | 9.21    | 0.000   |

Note: \*\*\* and \*\* represent significance at the 1% and 5% levels.

## 6 Conclusions

In this study, we examined young people's usage of online purchasing applications on smartphones, the priorities for attributes of the applications, and factors affecting young people's priorities. Our research demonstrated that more than 70% of university students had installed online shopping applications, indicating

that online shopping applications have become common among students. The number of online shopping applications, however, was not large. Students used only a few online shopping applications. Friends' word of mouth was a representative trigger for students to install applications. In addition, popular media, such as TV programs, magazines, and newspapers, and web portals prompted the installation of online shopping applications.

Furthermore, this study revealed that university students placed the highest priority on applications' regard for security and personal information. This implies that students valued security measures for online shopping applications more than they valued other shopping functions. Most smartphone users store their personal information on their smartphones, and since smartphones have become essential devices for daily life, users need secure applications. In our study, respondents placed high priority on the popularity of applications, as many users had been introduced to the applications by their friends and through word of mouth.

Moreover, this study revealed that some users' demographics affect their priorities for smartphone online purchasing. Female students evaluated assortment and availability of scarce goods higher than male students did. Female students did not highly value online shops' popularity compared to male students. In addition, users' living area affected their priorities for smartphone online purchasing. Rural students valued online shops' assortment more than urban students did. Furthermore, rural students placed about double the value on the security protection of online shops than urban students did.

Finally, users' online purchase experience affected their priorities. Students who did not possess online purchase experience highly valued concerns about security and personal information and might have overestimated the risks of smartphone online purchasing.

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